Claims

1. Catalyst comprising nickel, silica, alumina and magnesium, wherein the nickel to silicium atomic ratio is 2 to 30, the nickel to aluminium atomic ratio is 9 to 40, and the nickel to magnesium atomic ratio is 5-75, said catalyst having an average particle size of about 1 to about 20 μm.

2. Catalyst comprising nickel, silica, alumina and magnesium, wherein the nickel to silicium atomic ratio is 2 to 30, the nickel to aluminium atomic ratio is 9 to 40, and the nickel to magnesium atomic ratio is 5-75, wherein the catalyst is coated with a protective layer, effective in preventing oxidation of the catalyst.

3. Catalyst according to claims 1 or 2, having an average particle size of 3 to 8 μm.

4. Catalyst according to any of the preceding claims, wherein the total weight percentage of nickel (determined in the reduced catalyst) is 51-80 wt. %, preferably 55-75 wt. %.

5. Catalyst according to any of the preceding claims, wherein the catalyst comprises nickel crystallites and at least the majority of the crystallites has a diameter of less than 60 Å, preferably of 20-50 Å.

6. Catalyst according to any of the preceding claims, wherein the nickel to silicium atomic ratio is at least 6.5, preferably, 6.5 to about 22, more preferably 6.5 to about 15.

7. Catalyst according to any of the preceding claims , wherein the nickel to aluminium atomic ratio is about 10-35, preferably about 15 to about 22.

8. Catalyst according to any of the preceding claims, wherein the nickel to magnesium atomic ratio is about 5-50, preferably about 6 to about 20.

9. Catalyst according to any of the preceding claims, wherein the catalyst is coated with a protective layer, effective in preventing oxidation of the catalyst, said protective layer preferably comprising a fatty substance.

10. Catalyst according to any of the preceding claims, having pores, providing a pore volume (N_2, 20-600 Å) of at least 0.4 ml/g, preferably of 0.55 to 1 ml/g.

11. Catalyst according to any of the preceding claims, having a nickel surface area of 75 to 200 m^2/g.

12. Catalyst according to any of the preceding claims, having a BET surface area of about 300 to about 450 m^2/g.

13. Matrix particle, comprising a catalyst according to any of the preceding claims incorporated in a protective material, preferably a fatty substance.

14. Slurry, comprising a catalyst according to any of the claims 1-12.

15. Method for preparing a catalyst according to any of the claims 1-12, wherein

- a nickel source, a silica source, an alumina source and a magnesium source are mixed in a liquid and co-precipitated there from to form a catalyst precursor,
- the catalyst precursor is isolated from the solution, and
- the catalyst precursor is activated to form the catalyst.

16. Method according to claim 15, wherein the catalyst precursor is activated by reducing at least part of the nickel content of the catalyst precursor, and optionally the catalyst precursor is calcined before being reduced.

17. Method according to claim 15 or 16, wherein the catalyst is coated with a protective layer.

18 Catalyst precursor obtainable in a method according to any of the claims 15-17.

19. Process for hydrogenating an unsaturated organic compound, wherein the unsaturated organic compound is contacted with hydrogen in the presence of a catalyst as defined in any of the claims 1-12, a matrix particle according to claim 13 or a slurry according to claim 14.

20. Process according to claim 19, wherein the unsaturated organic compound is an unsaturated fatty substance.

21. Process for hydrogenating an unsaturated fatty substance comprising the contacting of the unsaturated fatty substance with hydrogen in

the presence of a catalyst comprising nickel, silica, alumina and magnesium, wherein the nickel to silicium atomic ratio is 2 to 30, the nickel to aluminium atomic ratio is 9 to 40, and the nickel to magnesium atomic ratio is 5-75.

22. Process according to claim 20 or 21, wherein the unsaturated fatty substance is a contaminated oil, a clean oil or a combination thereof.

23. Process according to claim 22, wherein the clean oil comprises a soybean oil, a sunflower oil, a palm oil, a cotton seed oil or a combination thereof.

24. Process according to claim 22 or 23, wherein the contaminated oil comprises fish oil, rape seed oil or a combination thereof.

25. Process according to any of the claims 19-24, wherein the hydrogenation is carried out in a slurry comprising the catalyst.

26. Use of a catalyst according to any of the claims 1-12, a matrix particle according to claim 13 or a slurry according to claim 14 in the hydrogenation of contaminated oil and clean oil.